AMENDMENTS TO THE DRAWINGS

The attached replacement sheets of drawings include changes to Figs. 1-6, 7, 9-10B, 12A-14B and 16A-17B. Specifically, the figures have been corrected in accordance with the Notice of Draftsperson's Patent Drawing Review as detailed below.

REMARKS

Claims 1-24 are pending. Claims 1-6, 8 and 21-24 are amended herein. Support for the amendments is detailed below.

Applicants' Response to the Objection to the Drawings

As set forth on the "Notice of Draftsperson's Patent Drawing Review" attached to the Office Action, a number of the Figures require correction. In response to the Draftsperson's requirements, applicants have:

- submitted a full-tone (photograph quality) set of Figs. 6, 7B, 9, 10B, 12B, 14A, 16;
- Separately labeled Figs for 7, 10, 12-16 and 17;
- Reconfigured Fig. 5;
- Removed solid black shading in Figs. 1-4.

As such, applicants have corrected the drawings in accordance with the draftsperson's requirements. A copy of the corrected drawings is submitted with this response.

Applicants' Response to the Objection to the Specification

The Office has objected to the title on the basis that it is not descriptive. In response thereto, applicants have amended the title so as to remove reference to the method of producing the substrate, as no claims currently pending are directed to this aspect of the invention. The currently amended title coincides with the preambles of the currently pending claims. Wherefore, applicants submit that the title is descriptive in accordance with 37 C.F.R. §1.72(a) requiring that the title is less than 500 characters and is as short and specific as possible.

Applicants' Response to the Claim Rejections under 35 U.S.C. § 112

Claims 1-10 and 21-24 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, the Office Action asserts that antecedent basis for the term "organic thin film" in the claims and "the buffer layer" in claim 6 is not correct. In response thereto applicants have amended the claims to use the term "an" as set forth in the above claim amendments. Applicants respectfully submit that these amendments provide the required antecedent basis.

Applicants' Response to the Claim Rejections under 35 U.S.C. § 102/§103

Claims 1 and 6 are rejected under 35 U.S.C. § 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Shi et al. (US Patent 6,326,640). In response thereto, applicants have amended claims 1 and 6 to more distinctly claim the subject matter regarded as the invention. Specifically, applicants have included the feature from original claim 3 and 8 that the buffer layer is acene system aromatics. Shi does not teach this feature of the current invention, nor would this feature be obvious in light of the teachings of Shi.

Shi does not teach or suggest an acene system aromatic as a buffer material. Shi teaches an organic thin film transistor 20 which is comprised of a gate insulator material 22 with an orientation film 23 formed thereon. A "molecularly aligned organic semiconductor film 24" is formed on the orientation film 23. See col. 3, lines 15-27 and Fig. 2. The orientation films (23, 32, 43, 52, 63, 73) may be polyimides, perfluoropolymers, liquid crystal polymers, or similar. See

col. 4, lines 23-29. The orientation film acts as a seed/foundation for the organic semiconductor layer to grow or deposit uniaxially. See col. 4, line 51 to col. 5, line 24. Applicants note that in Shi, the organic semiconductor layer is pentacene. As such, a buffer layer of the same material is not taught, nor is it obvious in light of Shi's teachings.

Claims 1-3, 6-8 and 21-24 are rejected under 35 U.S.C. § 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Hirai (US 2003/0160235). As noted above, applicants have amended claims 1 and 6 to include the feature that the buffer layer is acene system aromatics. Further, applicants note that independent claims 21-24 likewise require this feature. Hirai does not teach, nor render obvious this feature of the currently claimed invention.

The Office Action cites to the teachings regarding Figs. 5 of Hirai at paragraphs [0095] to [0116]. Therein, an organic thin film 3 is described. Among the numerous possible organic materials to be employed for the film 3 both pentacene and fullerenes are listed. See paragraph [0097]. However, the second insulating layer 4, which the Office equates to a buffer layer, is not described until the example 1 at paragraph [0123]. Therein, the second insulating layer 4 is an ethylene glycol monomethyl ether solution of novolak resin. However, Hirai also describes a first insulation film 4 in regard to Figs. 4 as "an organic compound resin film is formed, then, the processing such as rubbing is conducted on the organic compound resin film so that it has a function as an orientation film of an organic semiconductor layer formed on the insulation layer." See paragraph [0092]. As such, similar to Shi detailed above, there is no teaching of pentacene

as the insulating layer 4. Nor is it obvious to one of skill in the art to utilize a buffer layer of the same material as the organic thin film 3.

Claims 1-3, 6-8 and 21-24 are rejected under 35 U.S.C. § 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Kelly et al. (US 6,433,359). As noted above, applicants have amended claims 1 and 6 to include the feature that the buffer layer is acene system aromatics. Further, applicants note that independent claims 21-24 likewise require this feature. Kelly does not teach, nor render obvious this feature of the currently claimed invention.

As with Shi and Hirai above, there is no teaching of pentacene as a buffer material in Kelly. Kelly teaches a self-assembled monolayer 16 is formed as an orienting film between an organic thin film 18 and a gate dielectric 14. See col. 5, lines 15-19. As described from col. 5, line 28 to col. 6, line 6, the self-assembled monolayer is comprised of a specific formulation (col. 5, lines 47-65) which bonds to the gate dielectric 14. Kelly's teaching of a self-assembled monolayer is extremely specific. The self-assembled monolayer" of Kelly is shown by the chemical formula in column 5, lines 47-65. Its general equation is X-Y-Zn, wherein Z comprises C, H and other elements. The buffer layer of the present invention is acene system aromatics, composed of only C and H. Wherefore, the present inventions structure differs from Kelly's self-assembled monolayer. As such Kelly does not teach all the limitations of the present invention, nor would one of skill in the art modify the specific structure of Kelly's self-assembled monolayer as doing so would clearly destroy the intended function of Kelly.

Claims 1, 3-6, 8-10 and 21-24 are rejected under 35 U.S.C. § 102(e) as being anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Afzali-Ardakani et al. (US 2004/0183070) (hereinafter "Afzali"). As noted above, applicants have amended claims 1 and 6 to include the feature that the buffer layer is acene system aromatics. Further, applicants note that independent claims 21-24 likewise require this feature. Afzali does not teach, nor render obvious this feature of the currently claimed invention.

The Office Action cites to the teaching of Afzali at paragraphs [0069] to [0071] illustrated in Figs. 4. Afzali describes a solution comprising an "interpenetrating" mixture of a pentacene precursor and an n-type material which includes soluble fullerenes. See paragraph [0070]. As described in paragraph [0072] the coated film 120 is heated "to obtain the heterojunction between pentacene and the semiconductor material." As such in Afzali, the semiconductor derived from the process is not comprised of a separate pentacene layer from the organic thin film layer 120. Rather, Afzali strongly teaches that the active layer 120 is a thorough mixture of the two components. Wherefore, Afzali does not teach a separate and distinct buffer layer as required by applicants' claims.

Applicants' Response to the Claim Rejections under 35 U.S.C. § 103

Claims 3-5 and 8-10 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Hirai (US 2003/0160235) as applied to claims 1 and 6 above, and further in view of Afzali-Ardakani et al. (US 2004/0183070). Claims 3-5 and 8-10 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Kelly et al. (US 6,433,359) as applied to claims 1 and 6 above, and

further in view of Afzali-Ardakani et al. (US 2004/0183070). Claims 21-24 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Kelly et al. (US 6,433,359) in view of Afzali-Ardakani et al. (US 2004/0183070). Claims 21-24 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Hirai (US 2003/0160235) in view of Afzali-Ardakani et al. (US 2004/0183070).

The common aspect of all the above §103 rejections is that they rely on a combination of one of Hirai or Kelly with Afzali. Specifically, the Office Action asserts that one of skill in the art would be motivated to use pentacene as set forth in Afzali in order to avoid using costly or high temperature vacuum processes. Applicants respectfully traverse on the basis that there is no reason in any of the references to use pentecene as a buffer material for an orientation layer.

Aflazi does not teach nor provide any reason for using pentacene as a substitute. Rather, as described above, the process of Afzali does not result in a separate buffer layer but a thorough mixture forming a single active layer 120. Further, as noted above, neither Kelly nor Hirai teach or suggest penacene as a buffer material, but rather as a possible component for the organic semiconductor material, and Afzali does not teach a buffer material at all. As such, the combination of references would not result in the claimed invention.

Claims 2 and 7 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Afzali-Ardakani et al. (US 2004/0183070) as applied to claims 1 and 6 above, and further in view of Redecker (US 6,872,969). By addressing the rejection to parent claims 1 and 6 in regard to Afzali, as detailed above, the current rejection of claims 2 and 7 should likewise be considered addressed by nature of their dependency.

In view of the aforementioned amendments and accompanying remarks, Applicants submit that the claims, as herein amended, are in condition for allowance. Applicants request such action at an early date.

If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney to arrange for an interview to expedite the disposition of this case.

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

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MJC/ttw

Enclosure: Replacement sheets Figs. 1-6, 7, 9-10B, 12A-14B and 16A-17B.